



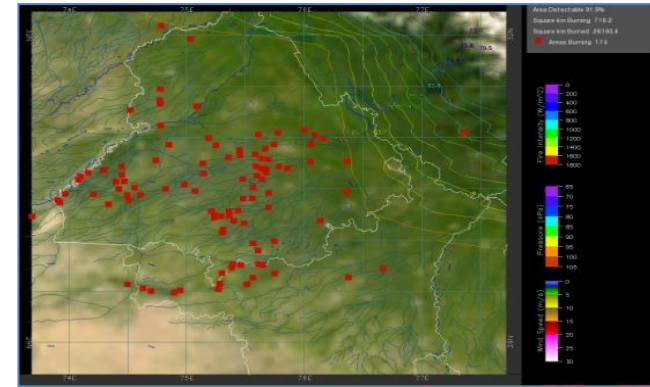
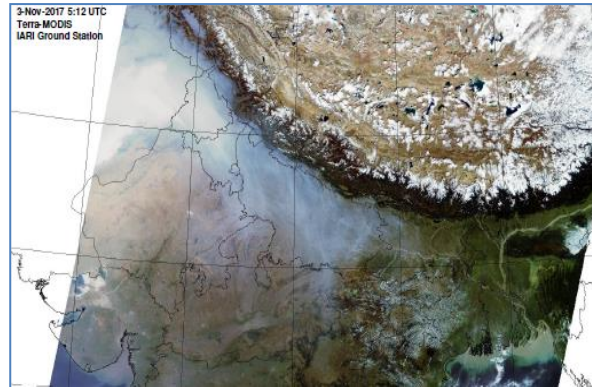
**Bulletin
No. 22**

**Events Date:
06-Oct-2021**

**Issued on:
06-Oct-2021**



MONITORING PADDY RESIDUE BURNING IN INDIA USING SATELLITE REMOTE SENSING DURING 2021



Prepared by:

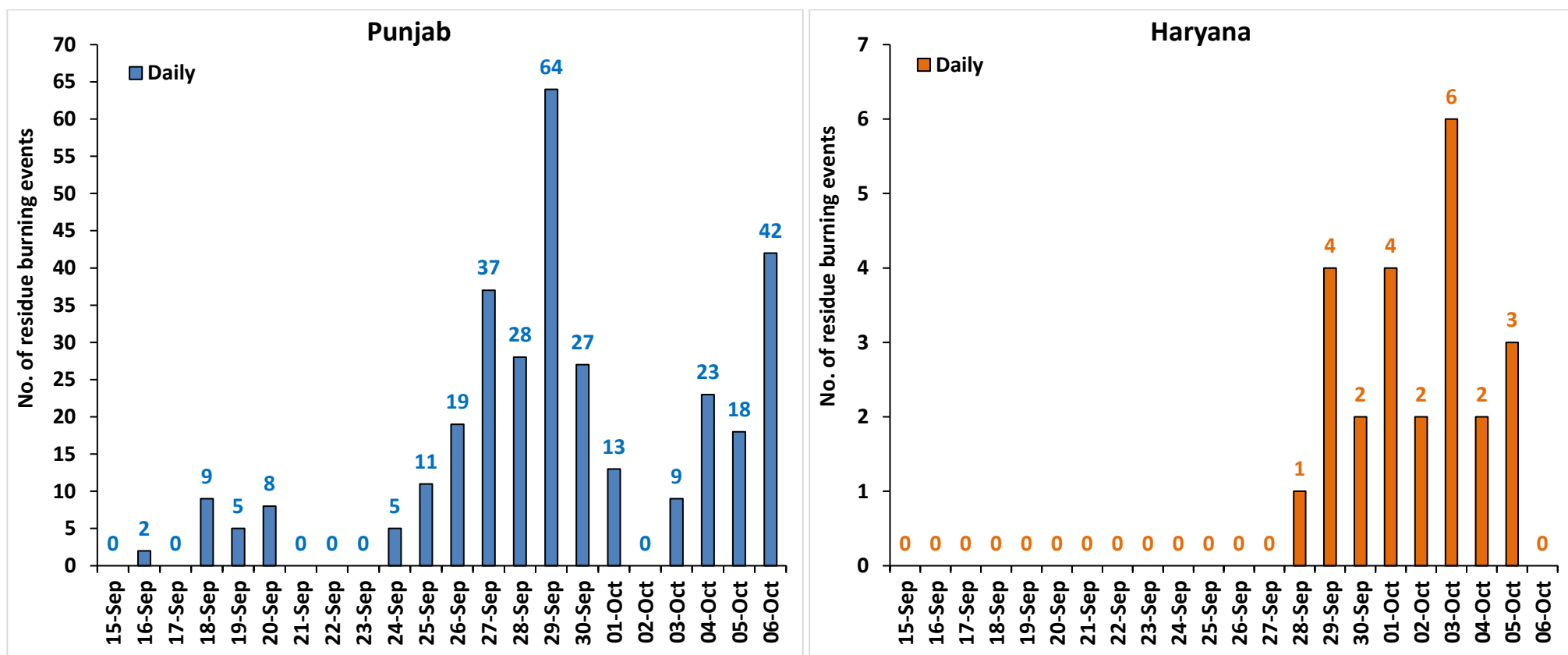
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

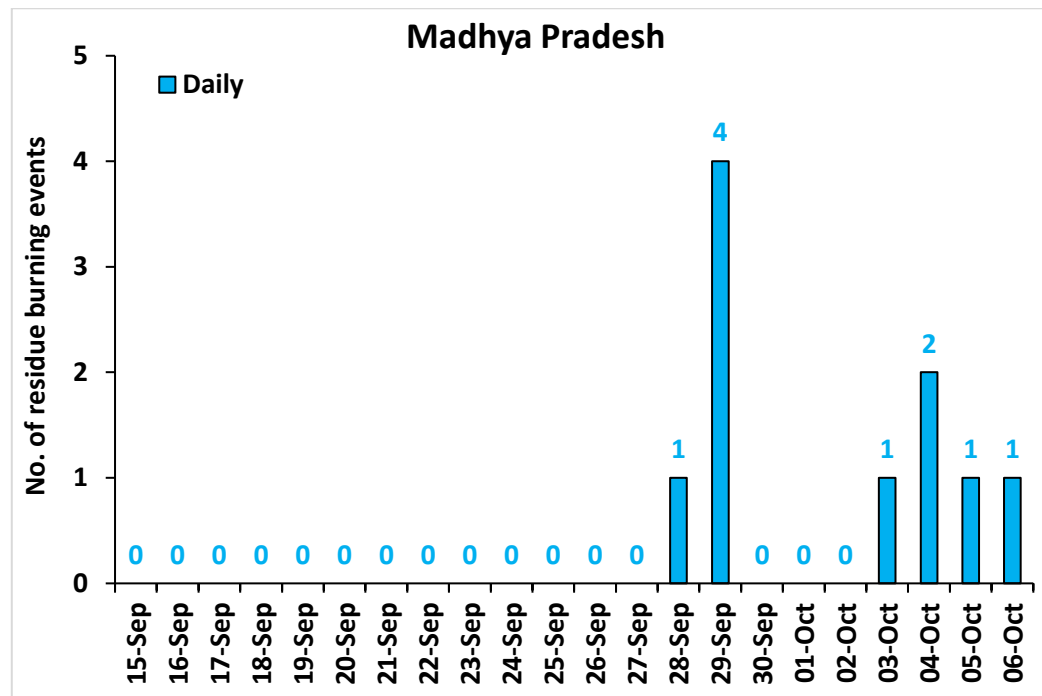
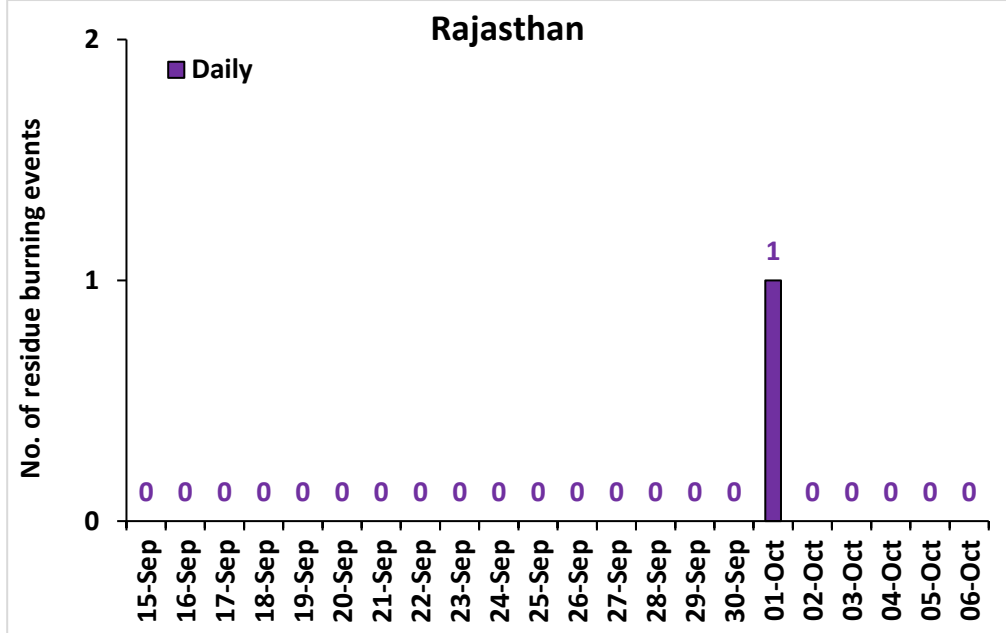
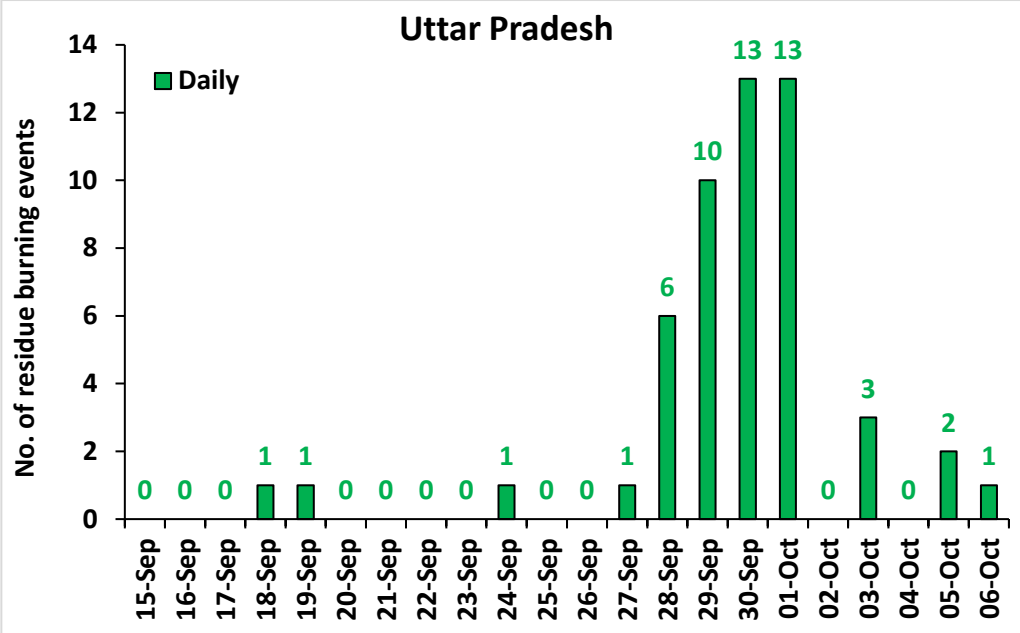
<http://creams.iari.res.in>

Highlights for 06-October-2021

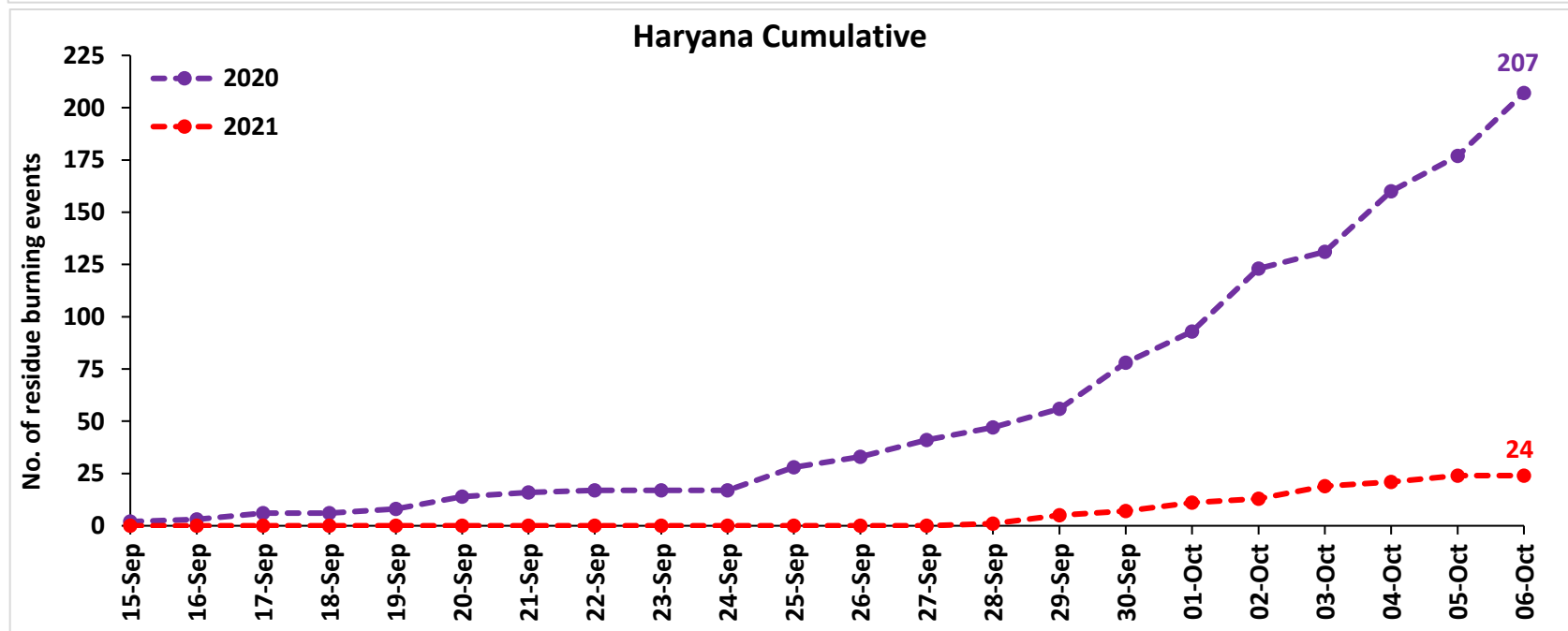
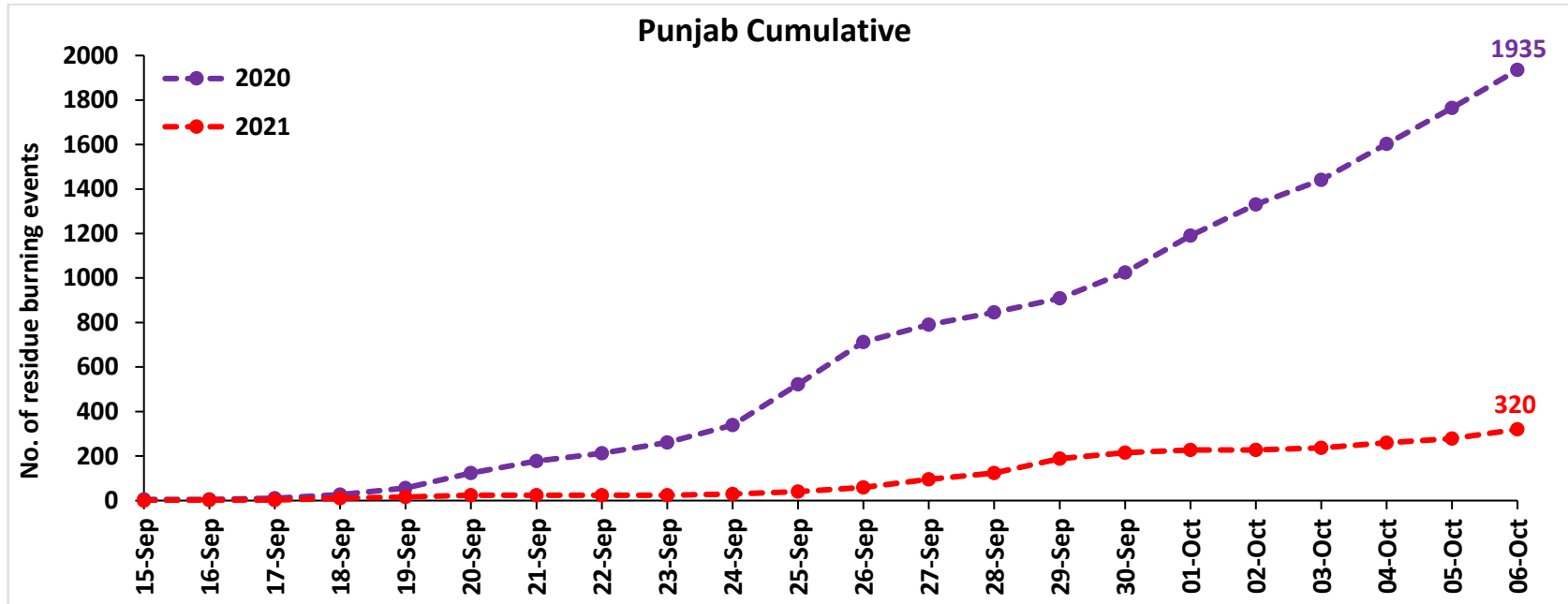
- The active fire events due to rice residue burning were monitored using satellite remote sensing, following the new "Standard Protocol for Estimation of Crop Residue Burning Fire Events using Satellite Data".
- Satellites detected **44** residue burning events in the six study States on 06-Oct-2021.
- The state wise events detected on 06-Oct-2021 were **42** in Punjab, **0** in Haryana, **1** in UP, **0** in Delhi, **0** in Rajasthan and **1** in MP.
- Detection of burning events by satellites was hampered due to scattered clouds over all the study states.

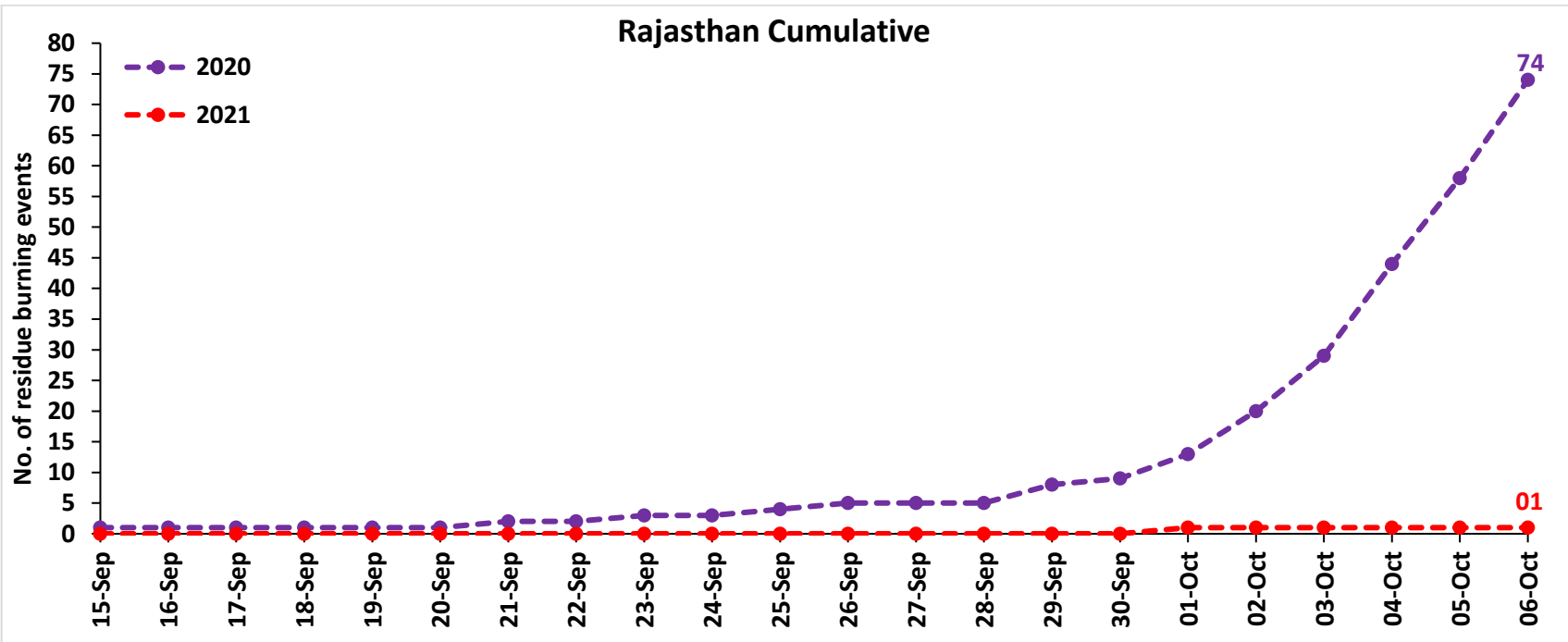
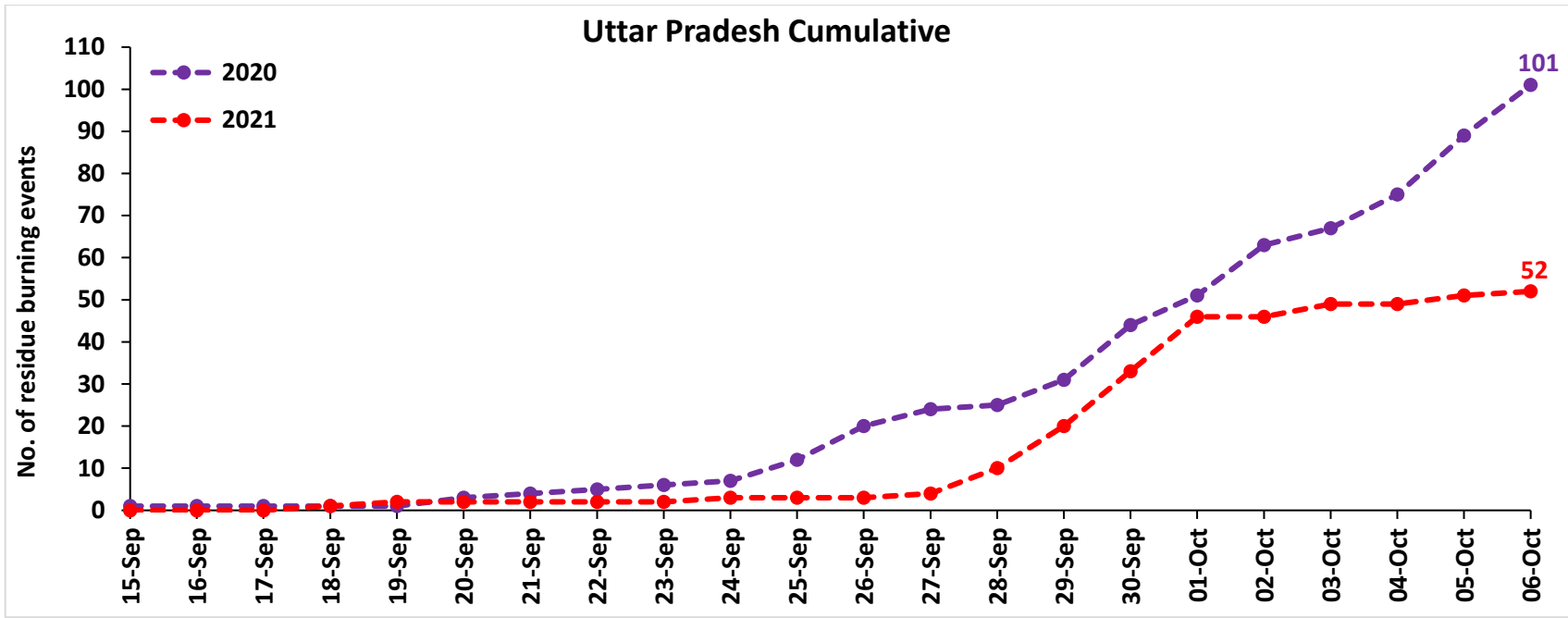
Temporal distribution of rice residue burning events for the study States in 2021

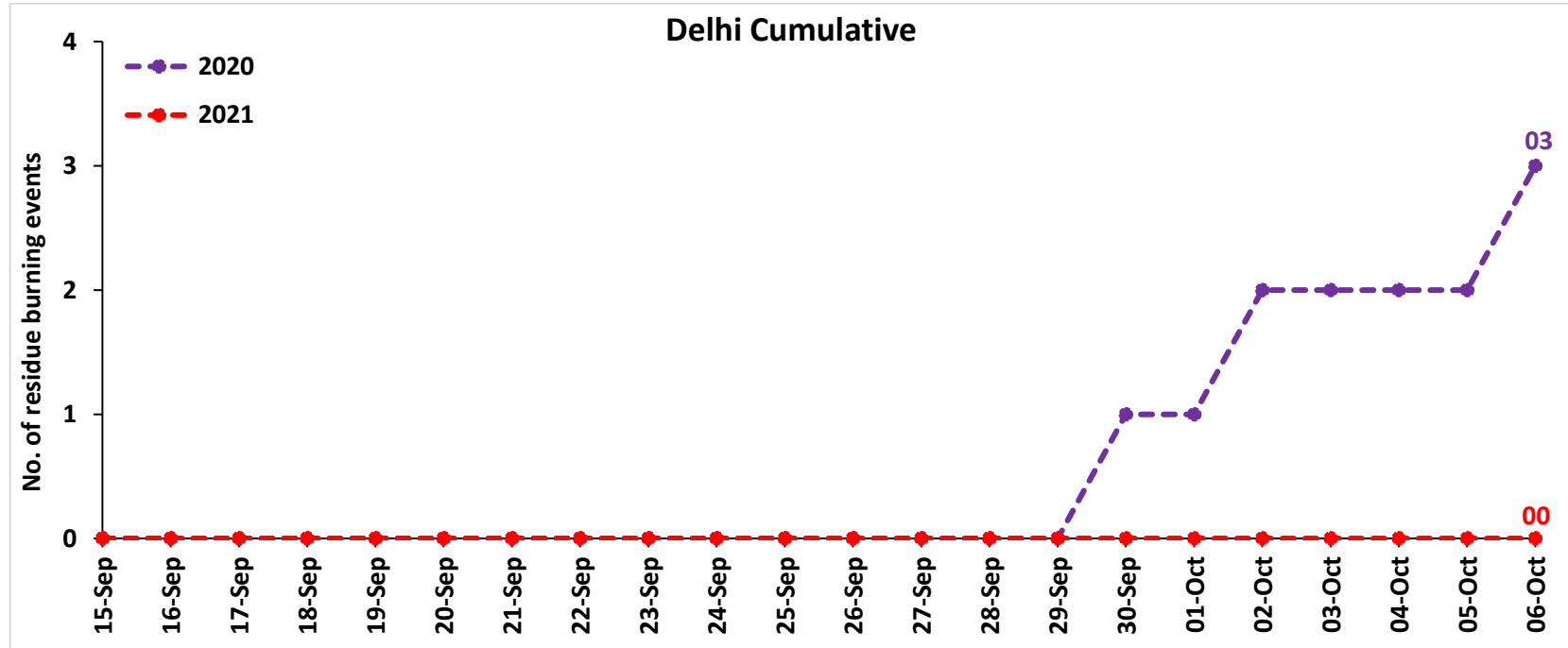
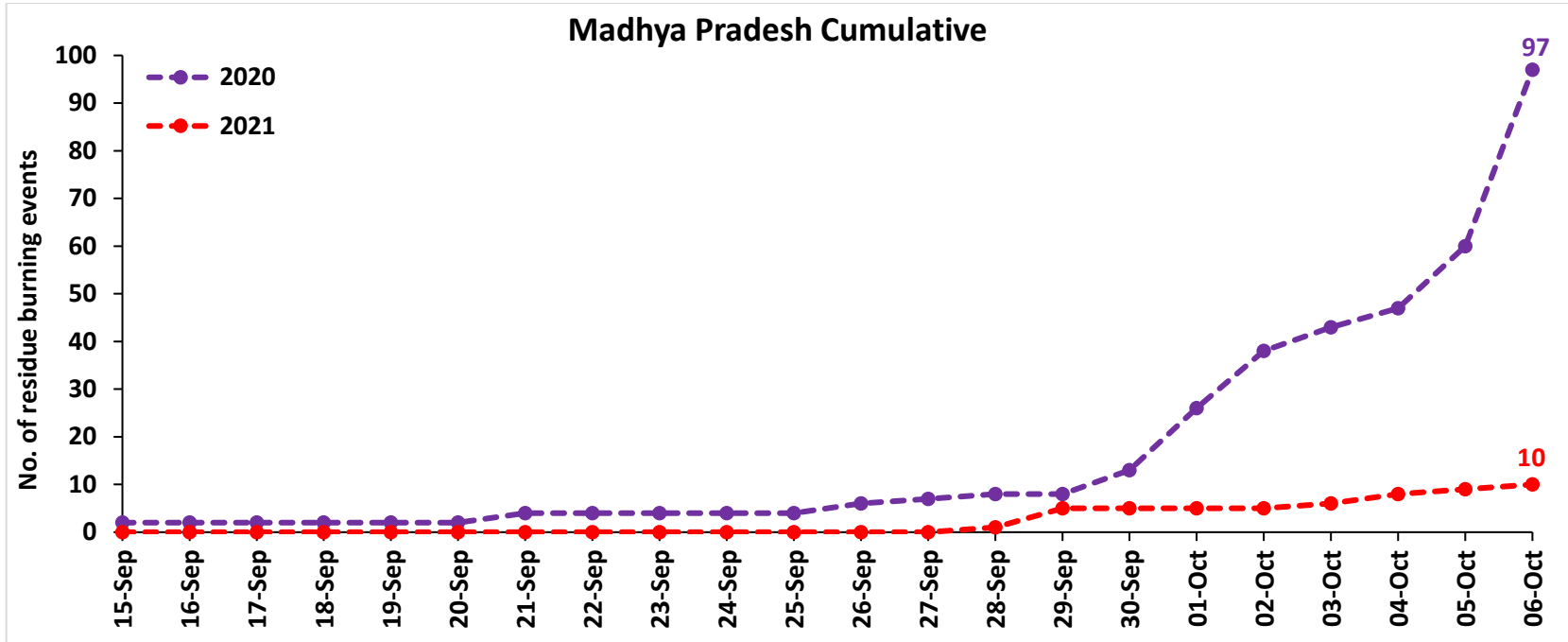




Comparison of residue burning events in current year (2021) with previous year (2020) for the study States

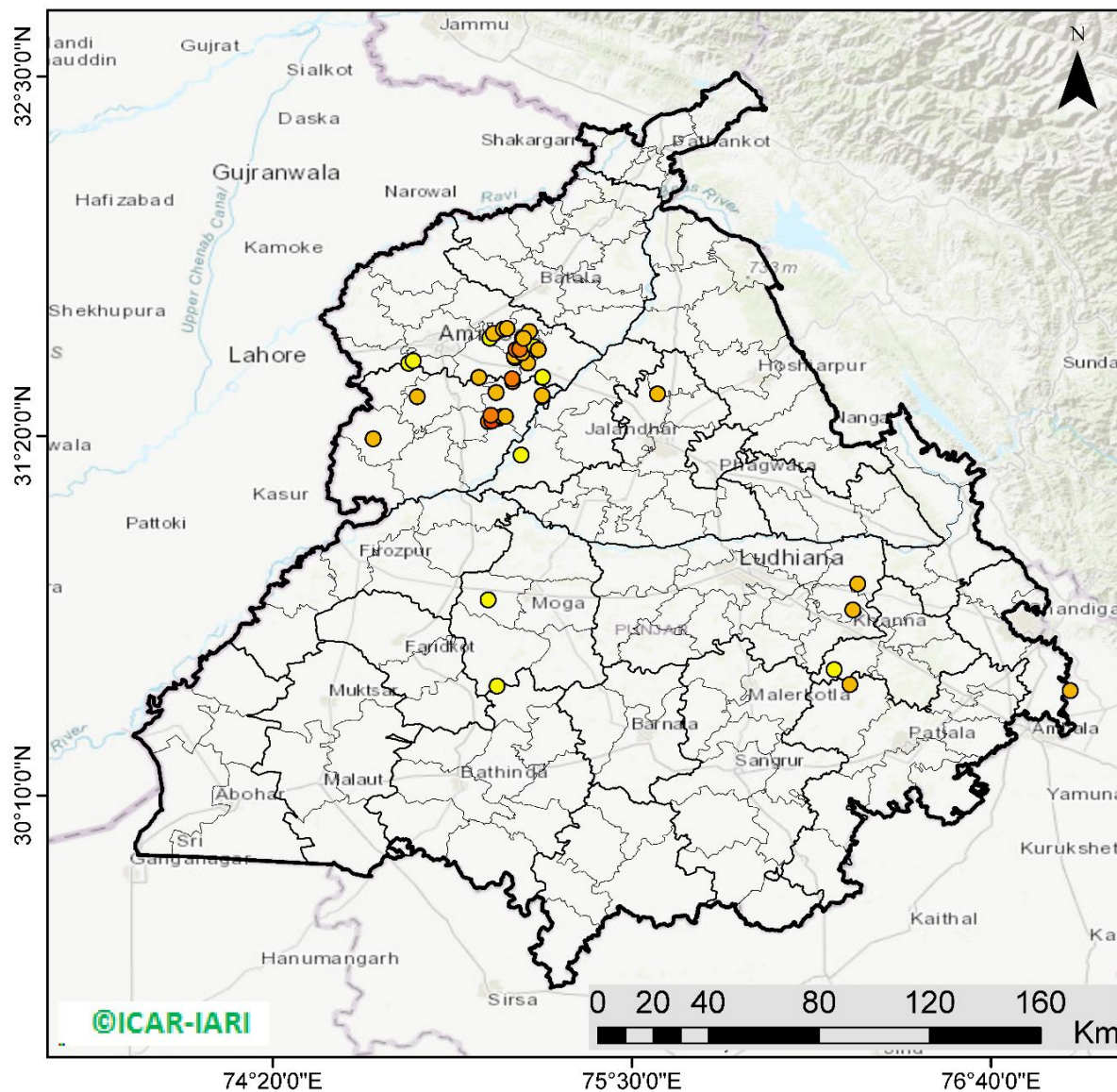






Punjab

RICE RESIDUE BURNING IN PUNJAB



42 burning events detected in Punjab on **06th October 2021**

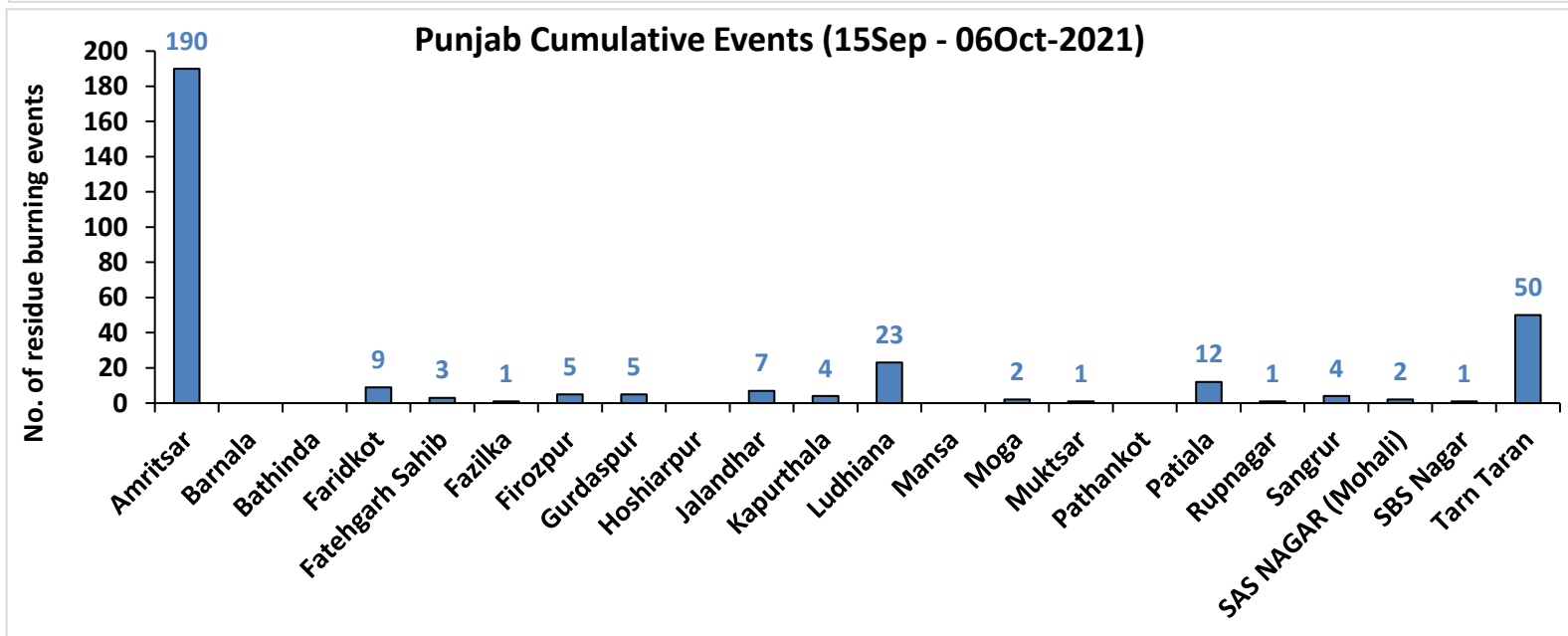
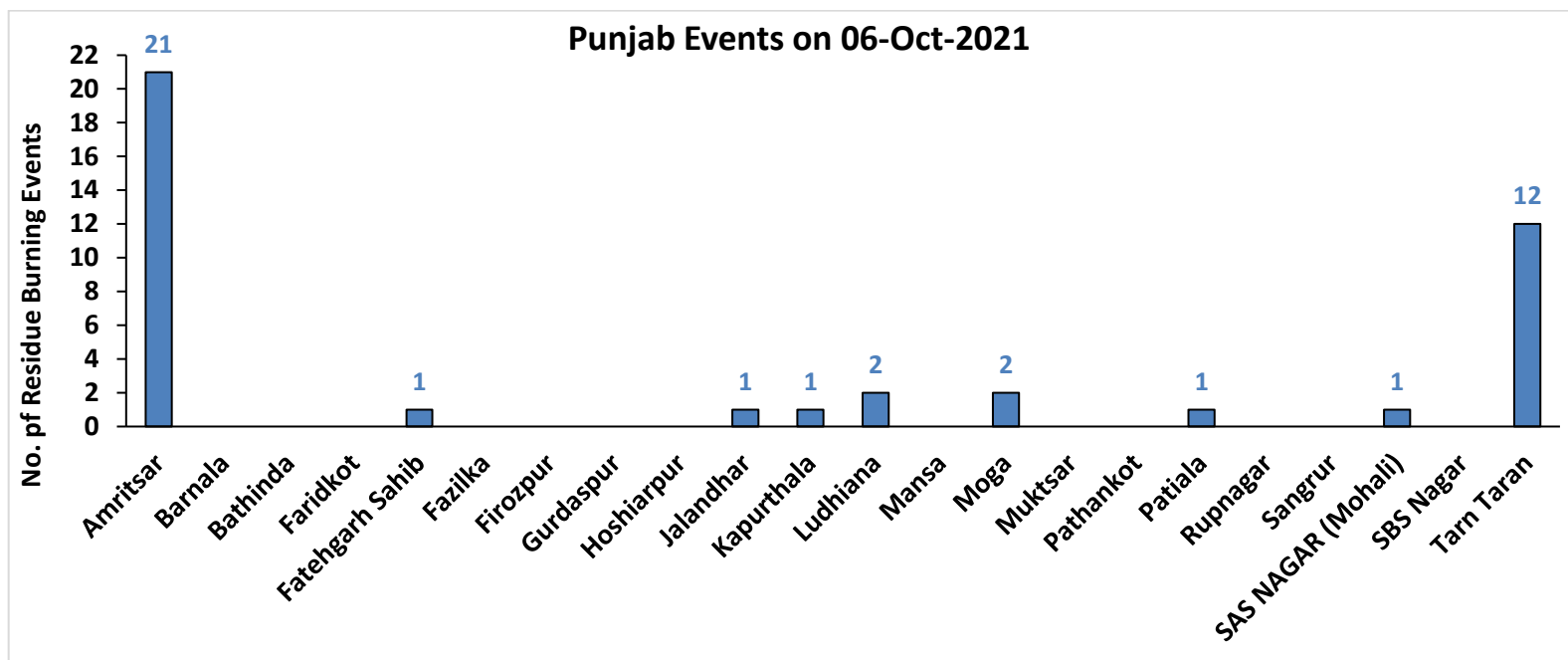
Fire Intensity (W/m²)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



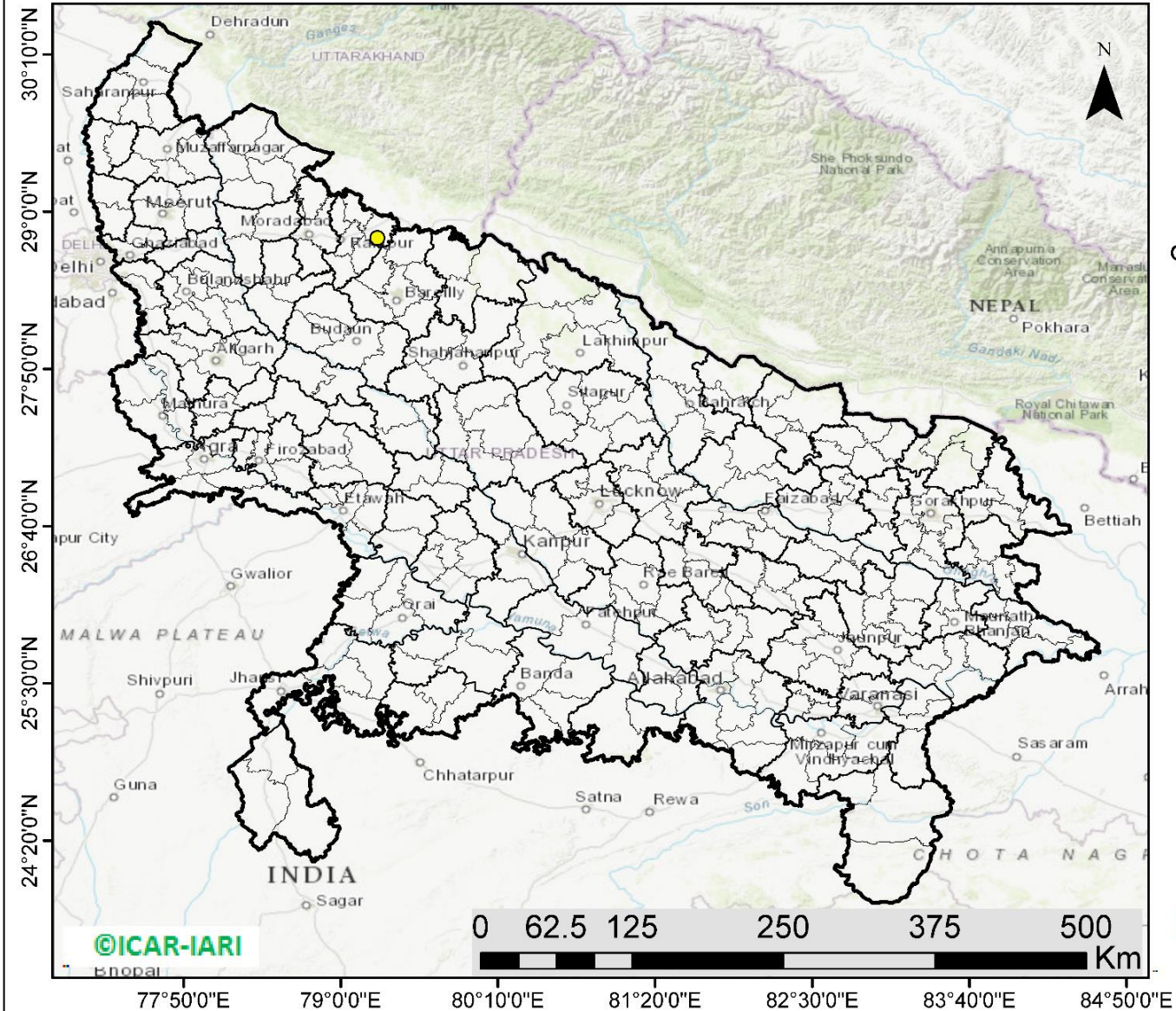
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Punjab (15Sep - 06Oct-2021)



Uttar Pradesh

RICE RESIDUE BURNING IN UTTAR PRADESH



01 burning events detected in Uttar Pradesh on 06th October 2021

Fire Intensity (W/m2)

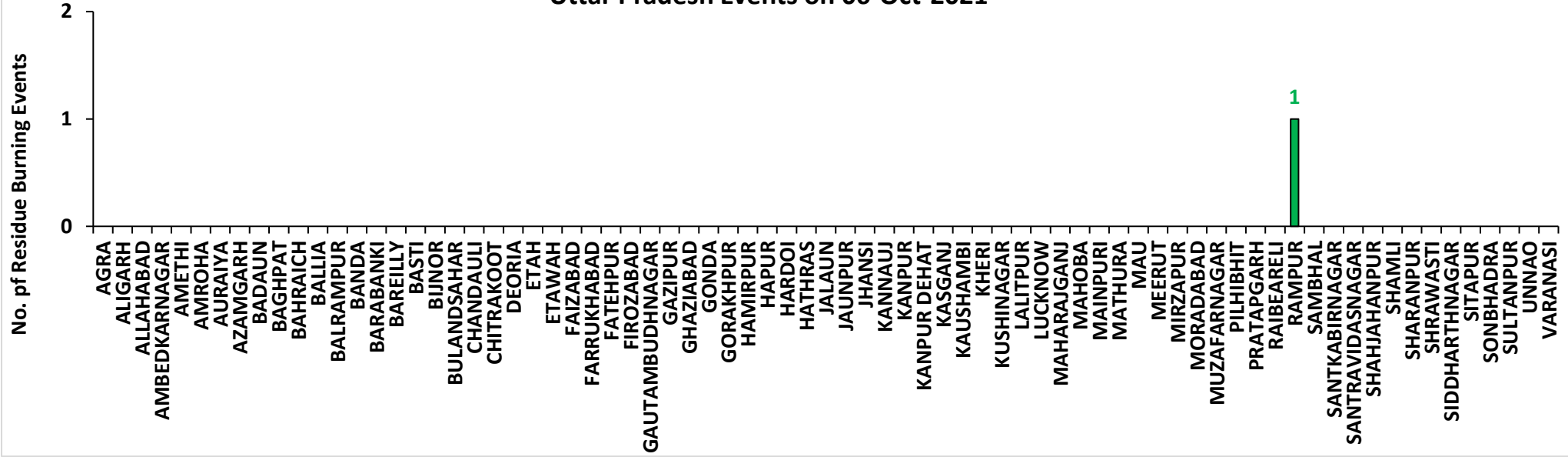
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



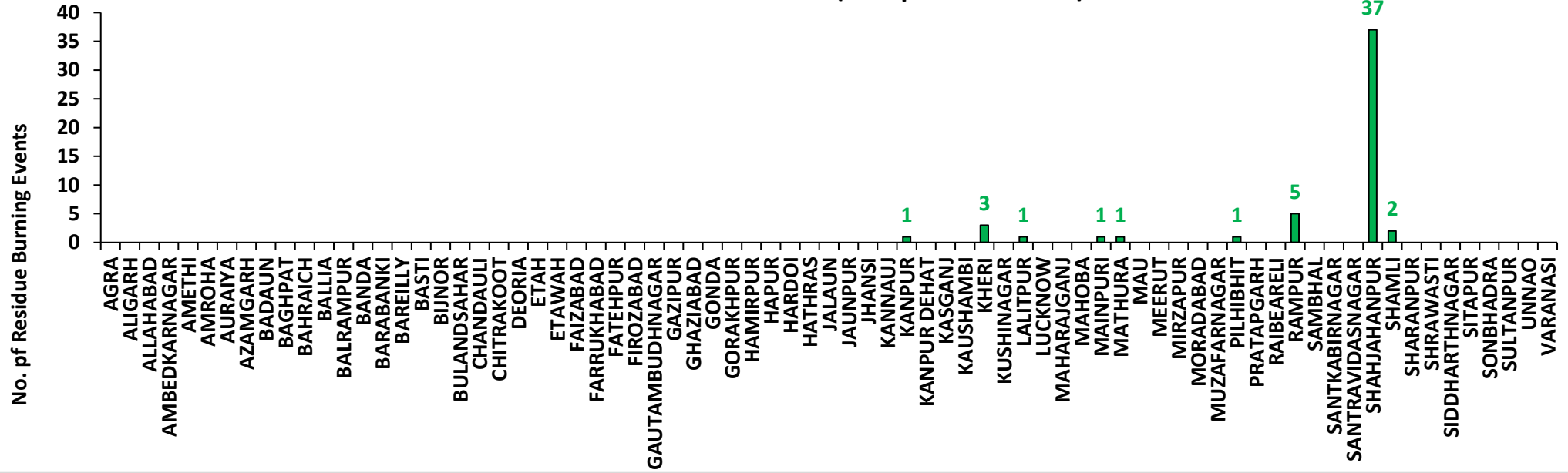
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Uttar Pradesh (15 Sep - 06 Oct-2021)

Uttar Pradesh Events on 06-Oct-2021

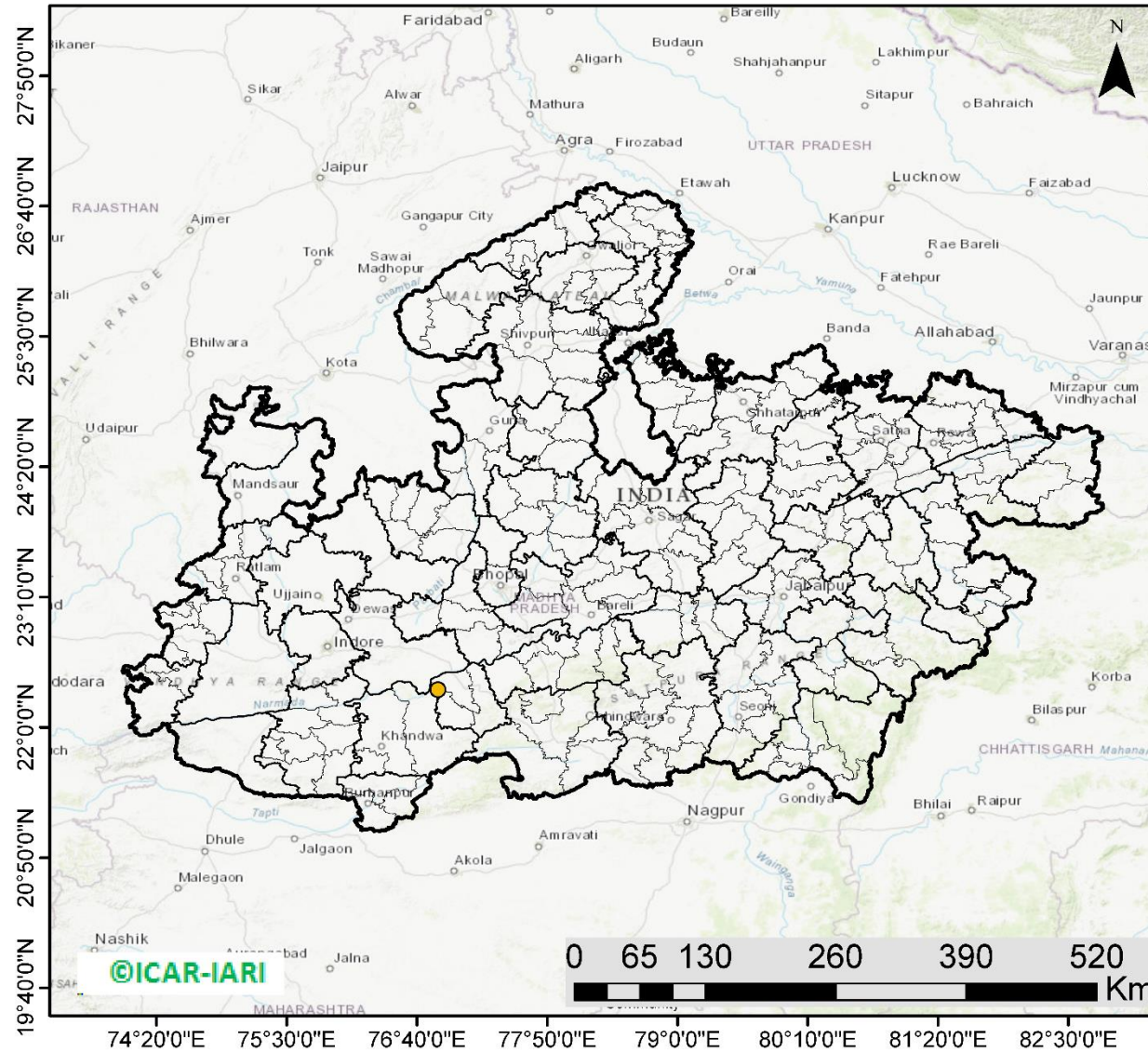


Uttar Pradesh Cumulative Events (15Sep - 06Oct-2021)



Madhya Pradesh

RICE RESIDUE BURNING IN MADHYA PRADESH



01 burning events detected in MP on **06th October 2021**

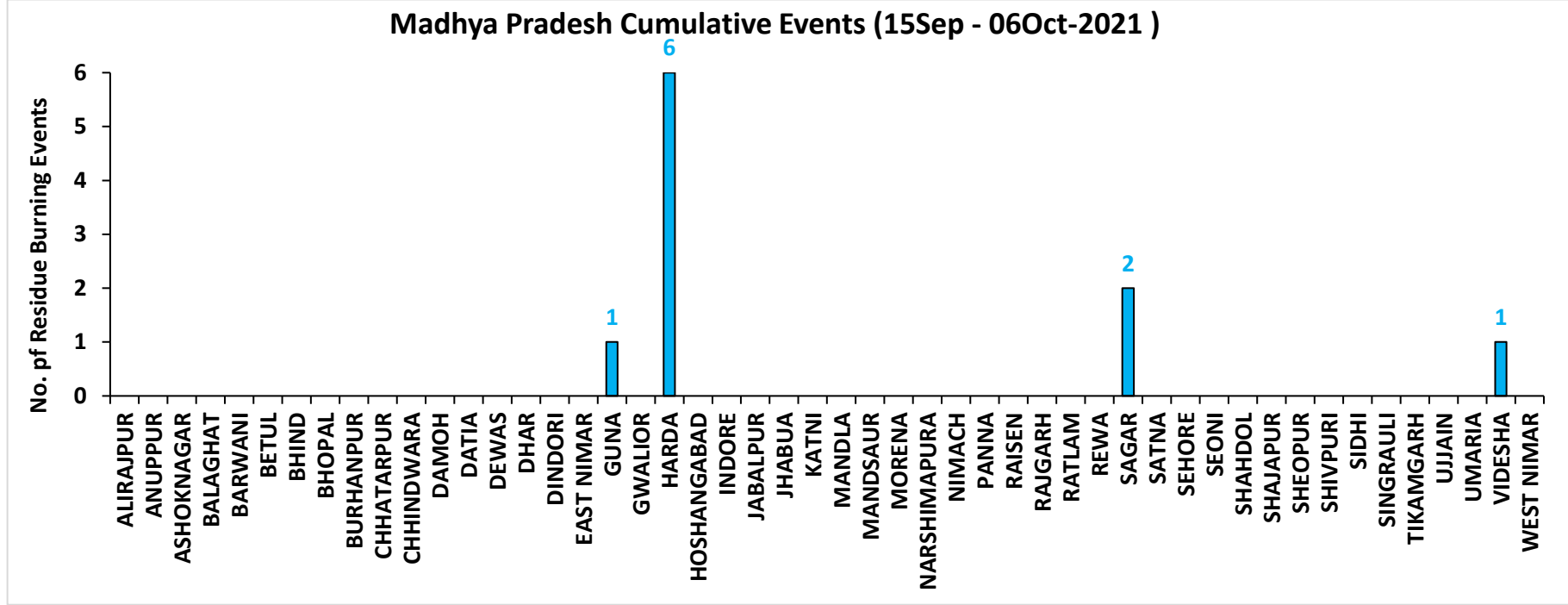
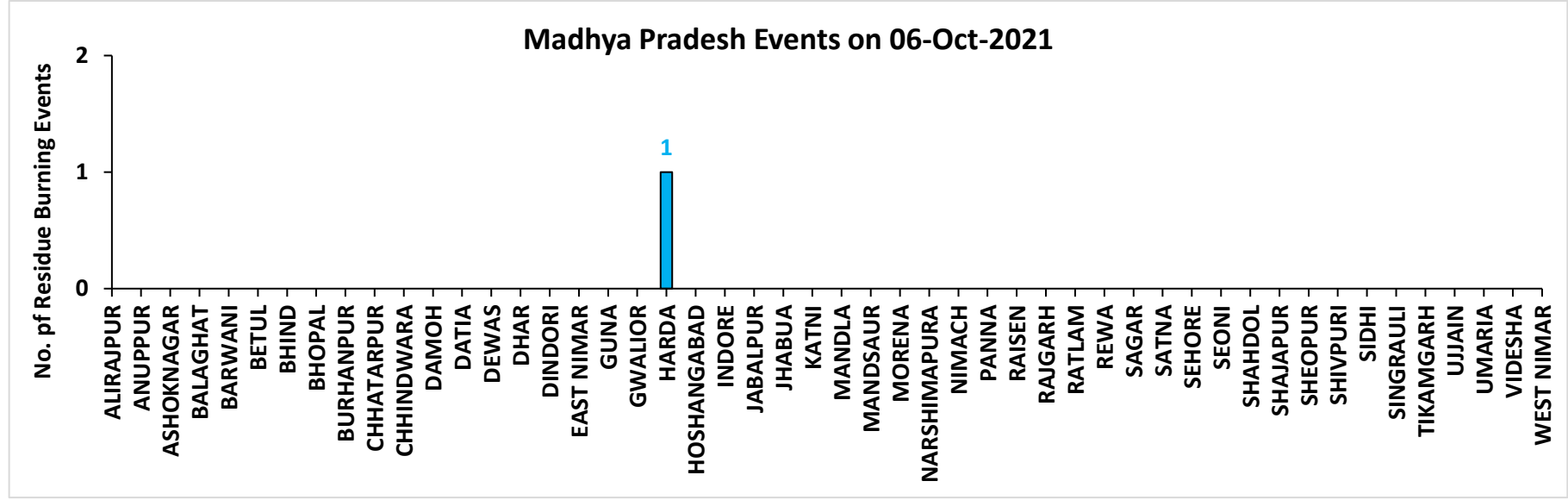
Fire Intensity (W/m²)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residues burning events in Madhya Pradesh (15 Sep - 06 Oct-2021)



District-wise cumulative number of residues burning events detected in 2020 and 2021
(Period: 15 September - 06 October)

(a) Punjab

District	15 Sep – 06 Oct	
	2020	2021
AMRITSAR	1141	190
BARNALA	5	0
BATHINDA	0	0
FARIDKOT	5	9
FATEHGARH SAHIB	19	3
FAZILKA	0	1
FIROZPUR	40	5
GURDASPUR	84	5
HOSHIARPUR	3	0
JALANDHAR	21	7
KAPURTHALA	28	4
LUDHIANA	46	23
MANSA	2	0
MOGA	12	2
MUKTSAR	1	1
PATHANKOT	0	0
PATIALA	89	12
RUPNAGAR	4	1
SANGRUR	32	4
SAS NAGAR (MOHALI)	10	2
SBS NAGAR	2	1
TARN TARAN	391	50
Total	1935	320

(b) Haryana

District	15 Sep – 06 Oct	
	2020	2021
AMBALA	27	1
BHIWANI	0	0
CHARKHI DADRI	0	0
FARIDABAD	0	0
FATEHABAD	17	1
GURGAON	0	0
HISAR	3	0
JHAJJAR	0	0
JIND	2	0
KAITHAL	29	2
KARNAL	55	5
KURUKSHETRA	43	13
MAHENDRAGARH	0	0
MEWAT	0	0
PALWAL	2	0
PANCHKULA	0	0
PANIPAT	6	0
REWARI	0	0
ROHTAK	0	0
SIRSA	2	0
SONIPAT	5	1
YAMUNANAGAR	16	1
Total	207	24

(c) Uttar Pradesh

District	15 Sep – 06 Oct							
	2020	2021	GAUTAMBUDHNAGAR	1	0	MUZAFARNAGAR	2	0
AGRA	0	0	GAZIPUR	0	0	PILHIBHIT	3	1
ALIGARH	7	0	GHAZIABAD	1	0	PRATAPGARH	0	0
ALLAHABAD	0	0	GONDA	0	0	RAIBEARELI	1	0
AMBEDKARNAGAR	0	0	GORAKHPUR	0	0	RAMPUR	2	5
AMETHI	0	0	HAMIRPUR	0	0	SAMBHAL	5	0
AMROHA	0	0	HAPUR	2	0	SANTKABIRNAGAR	0	0
AURAIYA	11	0	HARDOI	0	0	SANTRAVIDASNAGAR	0	0
AZAMGARH	0	0	HATHRAS	0	0	SHAHJAHANPUR	6	37
BADAUN	0	0	JALAUN	0	0	SHAMLI	10	2
BAGHPAT	1	0	JAUNPUR	0	0	SHARANPUR	4	0
BAHRAICH	1	0	JHANSI	4	0	SHRAWASTI	0	0
BALLIA	0	0	KANNAUJ	2	0	SIDDHARTHANAGAR	0	0
BALRAMPUR	0	0	KANPUR	0	1	SITAPUR	3	0
BANDA	0	0	KANPUR DEHAT	1	0	SONBHADRA	0	0
BARABANKI	1	0	KASGANJ	1	0	SULTANPUR	0	0
BAREILLY	4	0	KAUSHAMBI	1	0	UNNAO	2	0
BASTI	0	0	KHERI	4	3	VARANASI	0	0
BIJNOR	3	0	KUSHINAGAR	0	0	Total	101	52
BULANDSAHAR	1	0	LALITPUR	0	1			
CHANDAULI	0	0	LUCKNOW	0	0			
CHITRAKOOT	0	0	MAHARAJGANJ	0	0			
DEORIA	0	0	MAHOBAB	0	0			
ETAH	3	0	MAINPURI	0	1			
ETAWAH	0	0	MATHURA	2	1			
FAIZABAD	0	0	MAU	0	0			
FARRUKHABAD	0	0	MEERUT	8	0			
FATEHPUR	2	0	MIRZAPUR	0	0			
FIROZABAD	1	0	MORADABAD	1	0			

(d) Delhi

District	15 Sep – 06 Oct	
	2020	2021
CENTRAL	0	0
EAST	0	0
NEW DELHI	0	0
NORTH	2	0
NORTH EAST	0	0
NORTH WEST DELHI	0	0
SHAHADRA	0	0
SOUTH	1	0
SOUTH EAST	0	0
SOUTH WEST DELHI	0	0
WEST DELHI	0	0
Total	3	0

(e) Rajasthan

District	15 Sep – 06 Oct	
	2020	2021
AJMER	0	0
ALWAR	1	0
BANSWARA	0	0
BARAN	39	0
BARMER	2	0
BHARATPUR	0	0
BHILWARA	1	0
BIKANER	0	0
BUNDI	1	0
CHITTAURGARH	0	1
CHURU	0	0
DAUSA	0	0
DHOLPUR	0	0
DUNGARPUR	0	0
GANGANAGAR	1	0
HANUMANGARH	11	0
JAIPUR	0	0
JAISELMER	2	0
JALOR	0	0
JHALAWAR	0	0
JHUNJHUNUN	1	0
JODHPUR	1	0
KARAULI	1	0
KOTA	11	0
NAGAUR	0	0
PALI	1	0
PRATAPGARH	0	0
RAJSMAND	0	0
SIKAR	0	0
SIROHI	0	0
SWAIMADHOPUR	0	0
TONK	1	0
UDAIPUR	0	0
Total	74	1

(f) Madhya Pradesh

District	15 Sep – 06 Oct				
	2020	2021			
			PANNA	0	0
ALIRAJPUR	0	0	RAISEN	2	0
ANUPPUR	0	0	RAJGARH	1	0
ASHOKNAGAR	6	0	RATLAM	0	0
BALAGHAT	0	0	REWA	1	0
BARWANI	0	0	SAGAR	3	2
BETUL	0	0	SATNA	3	0
BHIND	0	0	SEHORE	4	0
BHOPAL	2	0	SEONI	0	0
BURHANPUR	0	0	SHAHDOL	0	0
CHHATARPUR	1	0	SHAJAPUR	4	0
CHHINDWARA	0	0	SHEOPUR	0	0
DAMOH	6	0	SHIVPURI	0	0
DATIA	2	0	SIDHI	0	0
DEWAS	2	0	SINGRAULI	0	0
DHAR	10	0	TIKAMGARH	0	0
DINDORI	0	0	UJJAIN	5	0
EAST NIMAR	0	0	UMARIA	0	0
GUNA	6	1	VIDESHA	15	1
GWALIOR	6	0	WEST NIMAR	0	0
HARDA	7	6	Total	97	10
HOSHANGABAD	3	0			
INDORE	1	0			
JABALPUR	4	0			
JHABUA	0	0			
KATNI	0	0			
MANDLA	0	0			
MANDSAUR	0	0			
MORENA	3	0			
NARSHIMAPURA	0	0			
NIMACH	0	0			

State-wise and date-wise number of paddy residue burning events detected in 2020 and 2021
(Period: 15 September - 06 October)

Number of Paddy Residue Burning Events Detected												
	Punjab		Haryana		Uttar Pradesh		Delhi		Rajasthan		Madhya Pradesh	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
15-Sep	5	0	2	0	1	0	0	0	1	0	2	0
16-Sep	0	2	1	0	0	0	0	0	0	0	0	0
17-Sep	5	0	3	0	0	0	0	0	0	0	0	0
18-Sep	17	9	0	0	0	1	0	0	0	0	0	0
19-Sep	30	5	2	0	0	1	0	0	0	0	0	0
20-Sep	67	8	6	0	2	0	0	0	0	0	0	0
21-Sep	54	0	2	0	1	0	0	0	1	0	2	0
22-Sep	34	0	1	0	1	0	0	0	0	0	0	0
23-Sep	49	0	0	0	1	0	0	0	1	0	0	0
24-Sep	78	5	0	0	1	1	0	0	0	0	0	0
25-Sep	184	11	11	0	5	0	0	0	1	0	0	0
26-Sep	190	19	5	0	8	0	0	0	1	0	2	0
27-Sep	78	37	8	0	4	1	0	0	0	0	1	0
28-Sep	55	28	6	1	1	6	0	0	0	0	1	1
29-Sep	63	64	9	4	6	10	0	0	3	0	0	4
30-Sep	116	27	22	2	13	13	1	0	1	0	5	0
01-Oct	165	13	15	4	7	13	0	0	4	1	13	0
02-Oct	141	0	30	2	12	0	1	0	7	0	12	0
03-Oct	110	9	8	6	4	3	0	0	9	0	5	1
04-Oct	162	23	29	2	8	0	0	0	15	0	4	2
05-Oct	161	18	17	3	14	2	0	0	14	0	13	1
06-Oct	171	42	30	0	12	1	1	0	16	0	37	1
Total	1935	320	207	24	101	52	3	0	74	1	97	10

Details of residue burning events in Punjab on 06-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	AMRITSAR	ATTARI	S-NPP	31.56900	74.77490	10/6/2021	12:52:11	D	3.40
2	AMRITSAR	ATTARI	S-NPP	31.57780	74.79000	10/6/2021	12:52:11	D	3.20
3	AMRITSAR	JANDIALA GURU	S-NPP	31.52300	75.00290	10/6/2021	12:52:11	D	5.90
4	AMRITSAR	MAJITHA	AQUA	31.68000	75.08300	10/6/2021	13:50:35	D	5.60
5	AMRITSAR	RAYYA	S-NPP	31.52410	75.21000	10/6/2021	12:52:11	D	4.30
6	AMRITSAR	RAYYA	AQUA	31.51900	75.11100	10/6/2021	13:50:35	D	10.60
7	AMRITSAR	TARSIKKA	S-NPP	31.56970	75.16190	10/6/2021	12:52:11	D	5.60
8	AMRITSAR	TARSIKKA	S-NPP	31.58720	75.12050	10/6/2021	12:52:11	D	7.10
9	AMRITSAR	TARSIKKA	S-NPP	31.59200	75.11900	10/6/2021	12:52:11	D	7.10
10	AMRITSAR	TARSIKKA	S-NPP	31.60280	75.14290	10/6/2021	12:52:11	D	8.70
11	AMRITSAR	TARSIKKA	S-NPP	31.62270	75.18410	10/6/2021	12:52:11	D	4.10
12	AMRITSAR	TARSIKKA	S-NPP	31.65050	75.14490	10/6/2021	14:32:28	D	3.80
13	AMRITSAR	TARSIKKA	S-NPP	31.65110	75.03870	10/6/2021	12:52:11	D	2.80
14	AMRITSAR	TARSIKKA	S-NPP	31.66640	75.05310	10/6/2021	12:52:11	D	6.20
15	AMRITSAR	TARSIKKA	S-NPP	31.67260	75.16690	10/6/2021	12:52:11	D	5.60
16	AMRITSAR	TARSIKKA	AQUA	31.61300	75.19600	10/6/2021	13:50:35	D	6.70
17	AMRITSAR	TARSIKKA	AQUA	31.61400	75.12400	10/6/2021	13:50:35	D	11.90
18	AMRITSAR	TARSIKKA	AQUA	31.61500	75.13600	10/6/2021	13:50:35	D	14.50
19	AMRITSAR	TARSIKKA	AQUA	31.65000	75.14800	10/6/2021	13:50:35	D	5.70
20	AMRITSAR	TARSIKKA	AQUA	31.66600	75.05000	10/6/2021	13:50:35	D	5.50
21	AMRITSAR	TARSIKKA	AQUA	31.68200	75.09500	10/6/2021	13:50:35	D	5.80
22	FATEHGARH SAHIB	AMLOH	S-NPP	30.57500	76.15700	10/6/2021	12:52:11	D	4.60
23	JALANDHAR	JALANDHAR WEST	S-NPP	31.46950	75.58360	10/6/2021	12:52:11	D	5.70
24	KAPURTHALA	SULTANPUR LODHI	S-NPP	31.27190	75.14030	10/6/2021	12:52:11	D	4.50
25	LUDHIANA	MACHHIWARA	S-NPP	30.85350	76.23370	10/6/2021	12:52:11	D	6.10
26	LUDHIANA	SAMRALA	S-NPP	30.76930	76.21850	10/6/2021	12:52:11	D	7.60
27	MOGA	BAGHA PURANA	S-NPP	30.52190	75.06190	10/6/2021	14:32:28	D	5.00
28	MOGA	MOGA-2	S-NPP	30.80150	75.03350	10/6/2021	12:52:11	D	3.80
29	PATIALA	NABHA	S-NPP	30.52690	76.20820	10/6/2021	12:52:11	D	6.90

30	SAS NAGAR (MOHALI)	DERABASSI	AQUA	30.50700	76.92400	10/6/2021	13:50:35	D	7.40
31	TARN TARAN	BHIKHIWIND	AQUA	31.32400	74.66000	10/6/2021	13:50:35	D	6.60
32	TARN TARAN	KHADUR SAHIB	S-NPP	31.39060	75.06680	10/6/2021	12:52:11	D	4.50
33	TARN TARAN	KHADUR SAHIB	S-NPP	31.46190	75.20910	10/6/2021	12:52:11	D	8.80
34	TARN TARAN	KHADUR SAHIB	S-NPP	31.46480	75.20830	10/6/2021	12:52:11	D	7.70
35	TARN TARAN	KHADUR SAHIB	AQUA	31.38000	75.03400	10/6/2021	13:50:35	D	12.30
36	TARN TARAN	KHADUR SAHIB	AQUA	31.38200	75.04500	10/6/2021	13:50:35	D	18.60
37	TARN TARAN	KHADUR SAHIB	AQUA	31.39600	75.07800	10/6/2021	13:50:35	D	6.40
38	TARN TARAN	KHADUR SAHIB	AQUA	31.39700	75.09000	10/6/2021	13:50:35	D	9.40
39	TARN TARAN	KHADUR SAHIB	AQUA	31.40100	75.04200	10/6/2021	13:50:35	D	13.60
40	TARN TARAN	KHADUR SAHIB	AQUA	31.47400	75.05900	10/6/2021	13:50:35	D	5.50
41	TARN TARAN	KHADUR SAHIB	AQUA	31.51000	75.11300	10/6/2021	13:50:35	D	13.40
42	TARN TARAN	TARN TARAN	AQUA	31.46100	74.80300	10/6/2021	13:50:35	D	6.70

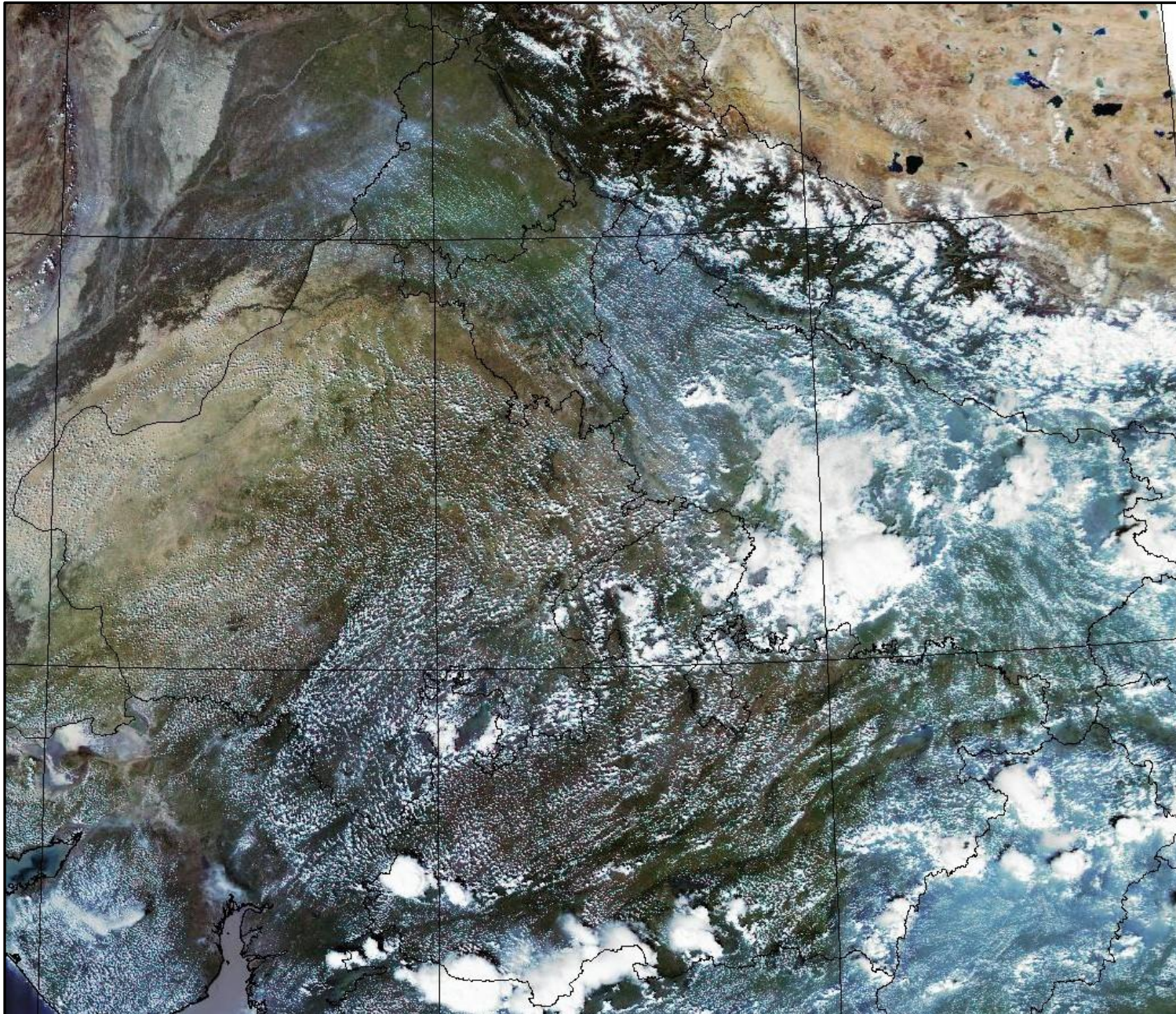
Details of residue burning events in Uttar Pradesh on 06-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	RAMPUR	BILASPUR	S-NPP	28.80580	79.27160	10/6/2021	12:52:11	D	3.30

Details of residue burning events in Madhya Pradesh on 06-Oct-2021

S. No.	District	Block	Satellite	Latitude	Longitude	ACQ_DATE	ACQ_TIME	Day / Night	Fire Power (W/m ²)
1	HARDA	HARDA	AQUA	22.33600	76.85500	10/6/2021	13:50:35	D	9.00

AQUA (MODIS) Satellite image (TCC) of North and Central India Acquired on 06-Oct-2021 at 13:47:50 IST by IARI Ground Station



The study used data received from following Satellites at NRSC Ground Station

S. No.	Satellite Name	Sensor	Resolution (meter)	Day / Night Passes
1.	Suomi NPP	VIIRS	375 / 750	Both
2.	Terra	MODIS	1000	Both
3.	Aqua	MODIS	1000	Both

**The rice mask for the Punjab and Haryana were provided by MNCFC, MoA&FW, Govt of India
The kharif crop mask for Delhi, Uttar Pradesh, Rajasthan and Madhya Pradesh were provided by NRSC**

Study Team

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GIS Maps of fire events can be visualized online on ICAR KRISHI Geoportal website: <http://geoportal.icar.gov.in:8080/geoexplorer/composer/>
(Part of KRISHI Portal: <https://krishi.icar.gov.in> initiative)
